



Molecular identification of the traditional herbal medicines, *Arisaematis Rhizoma* and *Pinelliae Tuber*, and common adulterants via universal DNA barcode sequences

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ABSTRACT. Methods to identify *Pinelliae Tuber* and *Arisaematis Rhizoma* are required because of frequent reciprocal substitution between these two herbal medicines and the existence of several closely related plant materials. As a result of the morphological similarity of dried tubers, correct discrimination of authentic herbal medicines is difficult by conventional methods. Therefore, we analyzed DNA barcode sequences to identify each herbal medicine and the common adulterants at a species level. To verify the identity of these herbal medicines, we collected five authentic species (*Pinellia ternata* for *Pinelliae Tuber*, and *Arisaema amurense*, *A. amurense* var. *serratum*, *A. erubescens*, and *A. heterophyllum* for *Arisaematis Rhizoma*) and six common adulterant plant species. Maturase K (*matK*) and ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (*rbcl*) genes were then amplified using universal primers. In comparative analyses of two DNA barcode sequences, we obtained 45 species-specific nucleotides sufficient to identify each species (except *A. erubescens* with *matK*) and 28 marker nucleotides for each species (except *P. pedatisecta*

with *rbcl*). Sequence differences at corresponding positions of the two combined DNA barcodes provided genetic marker nucleotides that could be used to identify specimens of the correct species among the analyzed medicinal plants. Furthermore, we generated a phylogenetic tree showing nine distinct groups depending on the species. These results can be used to authenticate *Pinelliae* Tuber and *Arisaematis* Rhizoma from their adulterants and to identify each species. Thus, comparative analyses of plant DNA barcode sequences identified useful genetic markers for the authentication of *Pinelliae* Tuber and *Arisaematis* Rhizoma from several adulterant herbal materials.

Key words: DNA barcode; Maturase K (*matK*); *Pinelliae* Tuber; Ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (*rbcl*); *Arisaematis* Rhizoma; Molecular authentication